# Introduction

EnSight supports active stereo display on workstations with quad-buffered OpenGL stereo capability, in addition to passive (polarized) stereo support for detached displays (see **How To Setup Parallel Rendering**). Active stereo works by rapidly displaying alternating left and right eye views on the screen. An emitter (which sits on top of your display monitor) sends an infrared signal to special glasses worn by the viewer(s). The glasses contain liquid crystal shutters that alternately open and close the left and right eye lenses in response to the signal from the emitter in sync with the monitor display. The update frequency is such that the viewer effectively fuses the left and right views into a single stereo image.

Stereo is useful for viewing any type of visually complex geometry. It is especially helpful for visualizing amorphous objects such as animating particle traces, trace ribbons, or discrete particles. It has also been noted that management and customers are typically quite impressed by stereo display.

See the “See Also” section below for information on purchasing NuVision stereo glasses through CEI.

# Basic Operation

In EnSight, stereo display is enabled by pressing the F12 key on your keyboard. Pressing the F12 key again will return to normal display. The stereo separation angle can be controlled by pressing the F10 and F11 keys. F10 decreases the angle and F11 increases the angle. When EnSight is configured to use a detached display (see **How To Setup Parallel Rendering**), these commands affect only the detached display. The GUI window remains monoscopic.

## Configuring your display

On most platforms the display is not initialized by default in a mode which enables stereo viewing. In general quad-buffered stereo requires a refresh rate of 96Hz or higher. On some monitors it may be necessary to decrease the display resolution in order to accommodate this higher refresh rate. Check your monitor documentation before attempting to change the refresh rate.

For Unix platforms there is a utility distributed with EnSight which can be used to determine if your display has stereo capability. Run ‘glx_info’ and look for X visuals with a ‘y’ the column ‘stro’. If none exist, then the current display parameters do not allow for stereo viewing.

Below are example instructions for various platform configurations which have been tested and confirmed to work with EnSight. When in doubt, refer to your system documentation for OpenGL as well as the X server (Unix) or video adapter device driver (Windows).

**Compaq Tru64 Unix**

1. Edit the file `/usr/var/X11/Xserver.conf`

   Find the section that looks similar to:

```
args <
! PowerStorm 300/350 Server args start
        -pn -su -bs -nice -2
! PowerStorm 300/350 Server args end
        -pn
>
```

   Modify to something like:

```
args <
! PowerStorm 300/350 Server args start
        -pn -su -bs -nice -2 -screen 1280x992 -vsync 100
! PowerStorm 300/350 Server args end
        -pn
>
```

   Restart the Xserver with /usr/sbin/xsetup

2. Connect an appropriate emitter. The NuVision emitter with a 3-pin to 5-pin converted has been tested.

CrystalEyes users should be able to use an 'ESGI' emitter with a 5-pin cable.

**HP-UX 10.2 - 11.0**

1. Configure the display settings using:

```
/opt/graphics/common/bin/setmon
```

   Select a setting which includes "Stereo in a Window"

2. Connect a 3-pin emitter to the graphic card. The NuVision emitter works fine. For CrystalEyes a converter cable may be needed.

**IBM AIX 4.3**

1. First, make sure that the graphics card is properly configured for OpenGL and stereo display. See the file `/usr/lpp/X11/README` for directions on configuring the X server. You may need to edit the file `/usr/lpp/X11/defaults/xserverrc` to add a "-stereo" argument similar to:

```
#------------------------------------------------------------------------
# Load GLX extension to the X server for OpenGL
#------------------------------------------------------------------------
if [ -f /usr/lpp/OpenGL/bin/loadGL -a    \
     -f /usr/lpp/X11/bin/loadAbx -a      \
     -f /usr/lpp/X11/bin/loadDBE ] ; then
  EXTENSIONS="$EXTENSIONS -x abx -x dbe -x GLX -stereo"
fi
```

2. Next you need to set the refresh rate to a stereo-capable setting. Stereo settings are usually 96+Hz vertical refresh. Use the 'smit' tool to see which settings you can use. When running smit, select:

   Devices->Graphic Displays->Select the Display Resolution...

   You will be prompted to select your graphics adapter. After selecting your graphics adapter you will see the current setting, and you can now query for the available settings. Hopefully you will find something at 96+Hz. If not, you may have a monitor which cannot support such high refresh. Connect a new monitor and reboot the machine, run smit again. Note that many monitors can only handle high refresh at lower resolution (i.e. 1024x768 at 96Hz or 120Hz).

3. The last step is to hook up a stereo emitter to sync with the glasses. We have successfully used the NuVision emitter with built-in 3-pin connector. The CrystalEyes EPRO emitter with external power and 3-pin to BNC cable should work as well.

**SGI Irix 6.5**

1. Configure the video resolution/refresh rate for stereo. On an Infinite Reality pipe this may be done with something like:

```
/usr/gfx/ircombine -destination eeprom -source file \
  /usr/gfx/ucode/KONA/dg4/cmb/1024x768_120s.cmb -target :0.0
```

   On other platforms the '`/usr/gfx/setmon`' command can be used to select the correct mode. An example may be:

```
/usr/gfx/setmon 1024x768_96s
```

   See the man page for platform specific information and the locations of the configuration files. You may get a message telling you that the format is not available, however in some cases all that is needed is a reboot in order to switch the resolution.

2. Hook up your stereo emitter. The CrystalEyes ESGI emitter works with the SGI, and there is a 3-pin to 9-pin cable to use the NuVision emitter on the SGI.

**Sun Solaris 8**

1. Configure the video resolution/refresh rate for stereo. On an Expert3D Card this is done with a command similar to:

```
fbconfig -dev /dev/fbs/ifb0 -res stereo
```

   The fbconfig utility is a wrapper tool that calls afbconfig/ffbconfig depending on the type of graphics adapter.

2. Hook up a stereo emitter. The Expert3D uses a 7-pin cable.

**Linux**

A few OpenGL drivers are known to support stereo OpenGL under Linux, including the HP fx-5/fx-10 and the ATI FireGL2/FireGL4. Documentation is included with the drivers, which may be downloaded from the card vendors web sites.

**MS Windows**

Configuration of stereo under Microsoft Windows is dependent upon the graphics card driver which is installed. Right-click on the background and choose “Properties” to open to Display Properties dialog. Look for a tab which such as “OpenGL Properties” or “Advanced” and search for a stereo option. In many cases there is a toggle button for enabling stereo display. You will usually need to restart the machine in order for changes to take effect. If stereo still does not work, try changing the display resolution, as stereo may not be available at higher resolutions.

## See Also

Most SGI hardware is “stereo ready” meaning that you need no additional hardware (other than glasses and the emitter). However, check with your local SGI technical representative to be sure. The O2, in particular is *not* stereo ready and additional hardware must be purchased.

In the U.S., NuVision hardware (glasses and emitters) can be purchased through CEI. Contact Sales and Marketing for pricing and availability:

CEI, Inc.
919-363-0883
919-363-0833 FAX
ensight@ceintl.com

Outside the U.S., contact your local EnSight distributor.